

REMARKS/ARGUMENTS

Applicants have received the Office Action dated May 14, 2009, in which the Examiner rejected claims 1-4, 6-26, 28 and 31-33 under 35 U.S.C. § 103(a) as allegedly obvious in view of Rowlands (U.S. Pat. No. 6,993,631, hereinafter "Rowlands") and Cypher (U.S. Pub. No. 2004/0002992, hereinafter "Cypher"). With this Response, Applicants amend claim 28 to correct a punctuation error. Based on the amendments and arguments herein, Applicants respectfully submit that all pending claims are in condition for allowance.

I. CLAIMS 1-4 AND 6-14

Independent claim 1 requires "a second node having a first state associated with the data that defines the second node as an ordering point for the data . . ." In rejecting this claim, the Examiner argues that this limitation is taught in Rowlands' Abstract and col. 21, ll. 27-43. Respectfully, the Examiner is mistaken. The only "states" even mentioned in these portions of Rowlands are in the Abstract, in which Rowlands mentions (1) the state in which a coherency block is provided to the first (requesting) node; and (2) the state of the coherency block recorded by the first node. In contrast, claim 1's "second node" is the node from which data is requested. Further, the Abstract makes no mention of a state that "defines the second node as an ordering point for the data," as required by claim 1. Thus, the portions of Rowlands cited by the Examiner do not render obvious the portion of claim 1 quoted above. Applicants have not found any such teaching in other parts of Rowlands or in Cypher. Thus, for at least the foregoing reasons, claims 1-4 and 6-14 are patentable over the combination of Rowlands and Cypher.

Claim 1 is patentable for yet another reason. Claim 1 requires "wherein the second node transitions from the first state to a transition state associated with migration of the ordering point to the first node." The Examiner cites Rowlands, col. 12, l. 66 – col. 13, l. 3 and col. 4, ll. 24-37 as teaching this limitation. Respectfully, the Examiner is mistaken because the Examiner does not properly interpret the claimed "transition state." As claimed, the "transition state" reflects the act of migration of the ordering point to the first node.

Rowlands, col. 12, l. 66 – col. 13, l. 3 teach “shared” and “exclusive” states. As explained in col. 4, ll. 1-23, however, these states merely reflect data ownership, **not** the act of migration. In fact, col. 4, ll. 24-37 explicitly admits that the term “state . . . refers to an indication of the **ownership** that the given node has for the cache block according to the coherency protocol implemented by the nodes” (emphasis added). Thus, again, these states merely reflect data ownership – not the act of migration, as claimed. No portion of Rowlands appears to teach this limitation, and no portion of Cypher appears to satisfy Rowlands’ deficiencies. Thus, based on the foregoing, claims 1-4 and 6-14 are patentable over the combination of Rowlands and Cypher.

Dependent claim 4 is patentable for yet another reason. Claim 4 requires “wherein the first node comprises a processor having an associated cache that comprises plurality of cache lines, one of the cache lines having an address associated with the data, the second state identifying the one of the cache lines as the ordering point for the data in the system.” The Examiner cites col. 2, ll. 4-11 of Rowlands as teaching this limitation. Although this portion of Rowlands appears to describe a “second node” containing a cache that retains “[a] state . . . for the first coherency block” and that the cache “is designated to retain the state,” Rowlands does not teach that its **first node** (which the Examiner says is analogous to the claimed “first node”) contains such a cache, nor does Rowlands teach that one of the cache lines has an address associated with the data, nor does Rowlands teach that a second state identifies one of the cache lines of that cache as an ordering point for the data in the system, as claimed. Apparently, all Rowlands teaches is a cache in the second node that retains a state. Such a teaching is hardly specific enough to anticipate claim 4. Cypher fails to satisfy Rowlands’ deficiencies. Thus, claim 4 is patentable for at least this additional reason.

Dependent claim 7 is patentable for another reason. Claim 7 requires:

a multi-processor system implementing a source broadcast protocol, the system further comprising a third node that issues a broadcast request that is received at the second node while in the transition state, the third node reissuing the broadcast request as a request employing an associated forward progress protocol implemented in the system in response to receiving a conflict response from the second node.

The Examiner asserts that Rowlands, col. 22, ll. 16-33 teach a similar limitation; specifically, that an address transfer may be retried or cancelled to permit a modified cache block to be written to memory or for other coherency activity to occur. While this teaching of Rowlands may be somewhat analogous to the “reissuing” feature in claim 7, there appears to be no teaching that anticipates claim 7 in its entirety. Specifically, Applicants find no teaching in Rowlands concerning “source broadcast protocol,” “broadcast[ing]” a request from a third node that is received by a second node at a particular point in time when the second node is in a transition state, reissuance of the request by the third node using a forward progress protocol in response to receiving a conflict response from the second node, etc. Claim 7 is more specific and detailed than a simple teaching of a request reissuance, as taught by Rowlands. Cypher fails to satisfy Rowlands’ deficiencies. Thus, claim 7 is patentable for this additional reason.

Claim 12 is patentable for an additional reason. Claim 12 requires “wherein the request for the data further comprises one of a source broadcast read request or a source broadcast write request for the data, and the response from the second node comprises a corresponding ownership data response.” The Examiner cites Rowlands, col. 9, ll. 47-60 as teaching this limitation (i.e., teaching a “write transaction”). Office Action, p. 7. As known to those of ordinary skill in the art, the mere teaching of a write transaction is not the same as a broadcast read request or a broadcast write request. As commonly known, broadcasting is different from simple read/write transactions. Cypher fails to satisfy Rowlands’ deficiencies. Thus, claim 12 is patentable for at least this additional reason.

II. CLAIMS 15-23

Independent claim 15 requires “the second state defining the source processor as the ordering point for the desired data.” The Examiner’s rejection does not specifically address this limitation. Thus, to respond to the Office Action, Applicants are forced to rely on the general characterizations of “states” found in Rowlands. As explained above with respect to claim 1, the term “states” – as explained in Rowlands – generally relates to data ownership and not to “defining the source processor as the ordering point for the desired data,” as required by claim 15. Cypher fails to satisfy Rowlands’ deficiencies. For at least this reason, claims 15-23 are patentable over the combination of Rowlands and Cypher.

Dependent claim 18 is patentable for an additional reason. Claim 18 requires “a transition state in connection with providing the ownership data response to the source processor.” Respectfully, the Examiner misinterprets the term “transition state” in making his rejection. As claimed, the “transition state” reflects the act of “providing the ownership data response” (i.e., data) to the source processor (emphasis added). As Applicants explained above with respect to claim 1 and, in fact, as the Examiner himself affirms in the ***Response to Arguments*** section of the Office Action, Rowlands’ “states” reflect ownership itself. They do not reflect the act of providing the ownership data response, as claimed. Cypher fails to satisfy this deficiency. Claim 18 is patentable for at least this additional reason.

Dependent claim 19 is patentable for another reason. Claim 19 requires: wherein the system employs a source broadcast protocol for controlling the broadcast request issued by the source processor and the response provided by the owner processor, the system further comprising a third processor that issues a broadcast request using the source broadcast protocol that is received at the owner processor while in the transition state, the third processor reissuing the request employing an associated forward progress protocol implemented in the system in response to receiving a conflict response from the owner processor.

As explained above with respect to claim 7, the combination of Rowlands and Cypher fails to teach or suggest this limitation. Thus, claim 19 is patentable over the combination of Rowlands and Cypher for at least this additional reason.

III. CLAIMS 24-26

Independent claim 24 requires “a cache state that defines the second processor as a cache ordering point for the requested data.” As previously explained with respect to claim 1, the combination of Rowlands and Cypher fails to teach such a limitation. Claims 24-26 are patentable for at least this reason.

Claim 24 is patentable for another reason. Claim 24 requires:

means for reissuing a request in the system using a forward progress protocol in response to detecting a conflict while employing a source broadcast protocol in each of the means for broadcasting, the means for providing and the means for transferring.

As explained above with respect to claim 7, the combination of Rowlands and Cypher fails to teach or suggest such a limitation. Thus, claims 24-26 are patentable for at least this additional reason.

IV. CLAIMS 28 AND 31-33

Independent claim 28 requires “the second state defining the source node as a new cache ordering point.” As explained above, the combination of Rowlands and Cypher fails to teach or suggest such a limitation. Claims 28 and 31-33 are patentable for at least this reason.

Claim 28 is patentable for another reason. Claim 28 requires “providing a migration acknowledgment signal from the source node to acknowledge receipt of the ownership data response at the source node.” The Examiner asserts that Rowlands, col. 10, l. 65 – col. 11, l. 2, teaches this limitation. Respectfully, the Examiner is mistaken. This portion of Rowlands merely teaches acknowledgement of receipt of a “kill command” – not receipt of the “ownership data response,” as claimed. Cypher does not appear to satisfy Rowlands’ deficiency. Claims 28 and 31-33 are patentable for at least this additional reason.

Claim 28 is patentable for yet additional reasons. Claim 28 requires “entering a transition state at the owner node in response to providing the ownership data response” and “releasing the owner node from the transition state in response to the migration acknowledgment signal.” The Examiner asserts that Rowlands teaches such limitations at col. 4, ll. 24-37. Respectfully, the Examiner is mistaken. Rowlands simply does not teach such entry and release of a transition state. Instead, col. 4, ll. 24-37 merely teach about the remote line directory 34. Rowlands teaches that this directory 34 is used to “track the state of the local cache blocks in the remote nodes.” Rowlands also teaches that this directory is “updated each time a cache block is transmitted to a remote node, the remote node returns the cache block to the home node, or the cache block is invalidated via probes.” However, neither here nor elsewhere does Rowlands teach entry and release of a transition state, as claimed. Cypher fails to satisfy Rowlands’ deficiencies. For at least this additional reason, claims 28 and 31-33 are patentable over the combination of Rowlands and Cypher.

V. CONCLUSION

In the course of the foregoing discussions, Applicants may have at times referred to claim limitations in shorthand fashion, or may have focused on a particular claim element. This discussion should not be interpreted to mean that the other limitations can be ignored or dismissed. The claims must be viewed as a whole, and each limitation of the claims must be considered when determining the patentability of the claims. Moreover, it should be understood that there may be other distinctions between the claims and the cited art which have yet to be raised, but which may be raised in the future.

Applicants respectfully request reconsideration and that a timely Notice of Allowance be issued in this case. It is believed that no extensions of time or fees are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 C.F.R. § 1.136(a), and any fees required (including

Appl. No. 10/761,048
Amdt. dated August 13, 2009
Reply to Office Action of May 14, 2009

fees for net addition of claims) are hereby authorized to be charged to Hewlett-Packard Development Company's Deposit Account No. 08-2025.

Respectfully submitted,

/Nick P. Patel/

Nick P. Patel
PTO Reg. No. 57,365
CONLEY ROSE, P.C.
(713) 238-8000 (Phone)
(713) 238-8008 (Fax)
AGENT FOR APPLICANTS

HEWLETT-PACKARD COMPANY
Intellectual Property Administration
Legal Dept., M/S 35
3404 E. Harmony Road
Fort Collins, CO 80528-9599